REPORT
ON
ROUND LAKE
COTTAGE POLLUTION
SURVEY
1978

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INTRODUCTION

A cottage pollution survey was carried out in Round Lake throughout the summer of 1978. A small group of Algonquin College students, on an "Experience 78" project, began work under the supervision of the Ministry of the Environment early in June.

The purpose of the survey was:

a) to examine and record the means of water supply and sewage disposal in use by establishments on Round Lake.
b) to identify those systems which are causing pollution.
c) to identify those which do not meet present day standards, and
d) to provide additional information for the concurrent intensive bacteriological survey being undertaken by the Technical Support Section of the Kingston Regional Office of the Ministry of the Environment.

Those systems identified as polluters are to be reported to the Renfrew County Health Unit, who will take the necessary abatement procedures.

METHOD

In June, 1978, two crews began gathering data for the project. The lake was divided into four sectors. In each sector, establishments having frontage on the lake, including those which had immediate access at the mouths of rivers and creeks, were described for identification purposes. An establishment survey number was assigned to each property, and the property was located on a base map.

With the descriptions completed, inspections were carried out on each establishment property, and the owners were interviewed about their water supply and sewage system. (Fig. 2 and 3) Sketches showing the location of cottage, lake, well, and sewage system were made, and measurements, slopes and soil types were noted. (Fig. 4)

An initial classification of the sewage system of each establishment was made in the field.

Figure 2.

ROUND LAKE COTTAGE POLLUTION SURVEY

(1978)

(1) Establishment Identity No. _____

(2) Owner _____

(3) Mailing Address _____

_____

(4) Evaluation of System

System Type	Performance
1. Septic Tank	1. Ponding
2. Tile Field	2. Effluent Breaking Out
3. Leaching Pit	3. Leaking
4. Pit Privy	4. Bad Odours
5. Cess Pool	5. Not Vermin Proof
6. Holding Tank	

System approved by Health Unit. Yes___ No___ Date ___

Comments _____

_____

_____

(5) Classification of System

1. Satisfactory	4. Nuisance (Toilet)
2. Seriously Substandard	5. Direct Polluter
3. Nuisance (Washwater)	6. Unclassified

Initial Classification ___ Final Classification ___

(6) Comments and Recommendation of Supervisor

_____

_____

_____

_____

Figure 3.

SKETCH

Inspector(s) ____ Establishment Survey No. ____

____

Remarks

Figure 4.

COTTAGE POLLUTION SURVEY

COMMERCIAL ESTABLISHNENTS

(1) Establishment Name _____

(2) Owner's Name _____

(3) Mailing Address _____

_____

(4) Number of Sites Tents _____

Trailers _____

Cottages _____

(5) Sewage Disposal

System Type No. Performance

_____

_____

_____

_____

_____

_____

Comments _____

_____

_____

(6) Classification of Systems

1. Satisfactory
2. Seriously Substandard
3. Nuiance (Washwater)
4. Nuisance (Toliet)
5. Direct Polluter
6. Unclassified

Intial Classification ____ Final Classification ____

(7) Comments and Recommendation of Supervisor

_____

_____

_____

CLASSIFICATION OF SYSTEMS

Classifications used are as follows:

1. Satisfactory
2. Seriously Substandard
3. Nuisance (wash water)
4. Nuisance (toilet and solid waste)
5. Direct Polluter
6. Unclassified

1. Satisfactory

A satisfactory system is one which meets the standards of good design, construction and location, and is not polluting; specifically, there is no evidence of pollution, past or present. There are no known significant defects in design, construction, or location of sewage or refuse disposal systems. There is no Public Health Nuisance. It is not potentially polluting.

2. Seriously Substandard

This is a system (or systems) having a defect which may cause the system to malfunction in the future causing either a Public Health Nuisance, danger of pollution, or inconvenience to the owner.

3. Nuisance (Wash Water)

This is a system (or systems) causing wash water to be exposed on the surface of the ground either directly through a waste pipe or escaping from a leaching pit or other means of disposal. Examples would be the waste pipe from a sink, bath, shower, washbasin, washtubs, washing machine, etc., discharging on the surface of the ground. Such a condition is known as a Public Health Nuisance (a potential health hazard) within the meaning of the Public Health Act.

Wash water discharged from sanitary fixtures is contaminated to a greater or lesser degree and in some circumstances can be dangerous to health. It creates an unhealthy environment. Children and domestic animals often become contaminated through direct contact with such wastes. Insects and rodents are also a factor.

4. Nuisance (toilet)

This is a system (or systems) causing a waste containing faecal and/or urinary discharges to be exposed on the surface of the ground, either directly through a pipe or escaping from some part of a sewage disposal system including privies.

5. Direct Polluter

This is a system or systems described as follows:

(a) visible drainage of sewage (including toilet, kitchen, laundry, sink, bath or shower wastes) or leachate of solid wastes into surface water of lake or river or into the groundwater, either by ditch, channel, pipe or directly over the ground surface.

(b) bacteriological, physical proof of sewage polluting the lake or river.

(c) Pit or pit privy penetrating below groundwater table.

(d) deposit of refuse or leachate directly into the lake or river.

6. Unclassified

This is a system (or systems) where it is not possible at the end of the survey to make a classification at that time. Usually they amount to only a few and include abandoned premises and some which may require further investigation when time allows.

EVALUATION OF A SYSTEM

PERFORMANCE

1. Ponding

Evidence of sewage effluent rising to the surface instead of percolating into the soil. The sewage forms a pond on the ground surface.

2. Effluent Breaking Out

Evidence of sewage effluent rising to the ground surface, it may then travel some distance and again seep away. Look for marks on the grass or surface, either black or grey. They are left as deposits between flushes of the system.

3. Leaking

This normally applies to septic tanks or piping where sewage effluent may leak out due to rupture, broken joints, or corrosion.

Note: Some small septic tanks are installed above ground.

4. Bad Odours

Bad odours usually denote some problem, note them when they occur.

5. Not Vermin Proof

Vermin in this case includes insects. Any kind of privy, for example, which does not exclude rodents (in particular rats) and insects is not in sanitary condition. Things to look for are absence of fly screens and broken woodwork around the privy box or pit. Any receptacle for garbage storage should also be protected.

DESCRIPTION OF ROUND LAKE AREA

LOCATION AND SIZE

Round Lake is located in Richards and Hagarty Townships in the County of Renfrew, Ontario, approximately 25 miles (40 km) southwest of Pembroke.

The almost circular lake covers 19 square miles (31 km^2) with an average diameter of 5 miles (8 km) and a perimeter of 19 miles (31 km). The mean elevation above sea level is 560 feet (170 m).

DRAINAGE

Round Lake is part of the Bonnechere River system, which drains southwest towards the Ottawa River. A number of other rivers and creeks drain into the lake, including the Sherwood River, Byers Creek, Jacks Creek, and Reserve Creek. The level of the lake is controlled by a dam on the outflowing Bonnechere River at the east end of the lake.

GEOLOGY AND SOILS

Round Lake lies on crystalline bedrock of the Canadian Shield, which outcrops in some areas. The soil types range from sandy loam to gravelly sand. A number of kame moraines and sandy plains remain in the area as glacial deposits, providing excellent drainage. (fig.5)

The vegetation surrounding the lake is mainly jack pine, red pine, and white pine with mixed hardwoods, and alders in the marshy areas.

RECREATIONAL USE

The many long sandy beaches and rolling hills surrounding the area have been particularly attractive to vacationers. Boating, fishing, swimming, waterskiing and camping are a few of the activities which take place on the lake. There are three public boat ramps providing access to the lake. Winter sports, including fishing, skiing, snow-shoeing and snowmobiling, are becoming increasingly popular, with Highway 62 and the Red Rock Road providing year-round access.

SETTLEMENT

Settlement was originally confined to Round Lake Centre, Bonnechere hamlet and a few farms around the lake. Development of cottages began around 1910 on the south shore near Round Lake Centre. After a relatively slow start, beaches south of the Bonnechere delta area began to be occupied by cottages. Then settlement began in St. Patricks Bay in the late 1930's. Further development took place in the Sandy bay south of Bonnechere hamlet, along the Red Rock Road and Highway 62, until most of the shoreline was occupied by cottagers. The most recent building has taken place in the sandy bay area immediately south of the Bonnechere outlet. Pine Point has been rapidly and extensively developed since the late 1960's.

Further subdivisions of lots have been made around the lake, for example in St. Patricks Bay, where a number of new permanent homes have recently been erected. (Fig 1, map enclosure)

SHORE TYPES OF ROUND LAKE

The area immediately bounding Round Lake, in which the survey took place, can be subdivided according to shorelines, of which there exist three main types. (Fig. 5).

ELEVATED ROCK SHORES

Areas having an elevated and generally rocky shoreline occur chiefly along the southwest shore, with similar areas being found between the Bonnechere delta and St. Patricks Bay, and stretches along the Red Rock Road. Characteristically, this shoreline type consists of subangular boulders or bedrock rising steeply from the lake, or in some cases a narrow gravel or sand beach with a steep bank or retaining wall immediately behind. The shoreline in these areas often has alternate small inlets and rocky bluffs. Offshore the water is generally deep. Dwellings are considerally elevated above the lake, and soils are often shallow. Red, white and jack pine grow profusely, with areas of poplar and birch. There has been some reforestation with red pine. The elevated rock shore areas were developed later, owing to their difficult terrain and lack of good sheltered docking or beach facilities.

LOW SANDY BAYS

The low, gently rising shore in the northwest bay, to the north and south of Bonnechere hamlet, together with St. Patricks Bay, Sand Bay and the sandy beach south of the Bonnechere outlet, make up the low sandy bay areas. Characterised by clear, shallow water bays and gently sloping beaches, most areas are thickly wooded with mature stands of red and white pine, with some jack pine, and spruce in the lower marshy areas. A

loamy sand soil predominates in these areas, which apart from the land immediately bordering creeks and rivers, has good drainage.

HIGH GRAVEL BLUFF - PINE POINT

This relatively small area of shoreline on Round Lake differs from the low sandy bays and high rocky shores. The peninsula is of glacial origin and is made up of a kame moraine. The thin soils are a gravelly sandy loom. The peninsula rises steeply from the lake and reaches a height of over 30 feet above the lake. It is thickly wooded with red pine and some poplar. Much erosion is evident along the south shore of the point. The area has only been recently developed for cottages, which all lie at the top of the steep banks.

ZONES OF ROUND LAKE

For the purposes of classification the shoreline of Round Lake was further subdivided, so that each zone could be examined separately as a unit (Fig. 6)

Zone 1

Bonnechere Inlet- North West Bay

This area contains the Bonnechere delta inlet and Turners Creek. It consists of a low, flat marshy area with beaches on either side. Offshore waters are shallow and sandy. Cottage development is confined to the long sandy beach south of the delta, stretching as far as the Sherwood Rivers. Much of the small bay to the north is occupied by commercial property confined mainly to the higher sandy bar near the shoreline. Behind the area lies swamp. The only elevated area lies to the north of the mouth of Turners Creek, where a small outcrop of bedrock occurs. Willows grow profusely in the delta area of the Bonnechere River and spruce are abundant in

the swamp to the north. Mature white pine are common in the long sandy beach area on the west shore while red pine have been planted in some areas.

Zone 2

North Shore Highway 62

The elevated rocky area on the north shore of Round Lake has no beaches. The shoreline rises steeply and consists of subangular rocks and gravel, the highest elevation occuring close to Highway 62 in St. Patrick's Bay. Here the cottages are closest to the lake. A number of permanent houses are situated in this zone south of highway 62.

Zone 3

St. Patrick's Bay, formerly Smiths Bay

This gently curving bay lies at the foot of a depression between the Gariepy mountains and Red Rock Mountain through which Jacks Creek drains into the centre of the Bay. The long, sandy beach rises gradually from the lake, the steepest shores occuring at both ends of the bay. On the sandy soils grow mixed hardwoods and red and jack pine. First settled in the late 1930's, cottages occupy long narrow lots bordering the Red Rock Road. Recently, there have been a few subdivisions of lots made with some permanent homes being built close to the lake.

Zone 4

Red Rock Road - East shore

This zone has a characteristically rocky shore with little or no beach. It is thickly wooded with Red Pine. The area is divided into two parts by Fays point, known locally as Two-Ten beach. The point has many characteristics in common with Pine Point, including extensive

erosion on the south shore. At present is not settled, apart from the Junior Ranger Camp. Where the Red Rock Road follows the shoreline, development of cottage properties has been relatively slow owing to the rugged local topography.

Zone 5

Bay north of Pine Point

This relatively small zone lies in a depression between the rocky Red Rock Road Zone and the high elevated Pine Point Peninsula. Behind the almost flat beach lies a swamp area with poorly drained day loom soils, on which spruce and red pines grow.

Zone 6

Pine Point

See notes on Shore types of Round Lake - High Gravel Bluff - Pine point.

Zone 7

Sand Bay and Bonnechere

Sand Bay is a very shallow sandy bay. This zone also includes settlement along the Bonnechere River. Soils are generally sandy loom, supporting red and white pines and mixed hardwoods. Settlement is scattered along the low shore and banks of the river.

Zone 8

Sand Beach - South East Shore

This zone shares many of the characteristics of St. Patrick's Bay, with its long, sandy beach and clear shallow waters. The shoreline slopes gently up from the lake, with a shallow depression behind the sand bar. The area is thickly wooded with red and jack pine. Settlement has been relatively recent. The lots are of a good size.

Zone 9

South West Shore - Highway 62

This very large zone stretches from the Sherwood River to the small creek at the west end of the sandy beach in Zone 8.

For the most part the shoreline is elevated above the lake by a natural steep bank of rocks and gravel three feet high or more, with several small inlets and headlands. Small gravel or sandy beaches are rare, and generally strewn with boulders. Most of the shoreline is thickly wooded with red, white, and jack pines mixed with poplars, white birch and other hardwoods, with occasional open areas. Some of these have been reforested with red pine. Highway 62 follows the shoreline closely at times, but present construction is diverting the road further from the shore.

Figure 6

ZONES OF ROUND LAKE

Zones	Establishment Survey Number	Location
1	C 1 - D 14	Bonnechere Inlet - North West Bay
2	D 15 - D 56	North Shore Hwy 62
3	D 57 - D 103	St. Patricks Bay
4	D 104 - A 12	Red Rock Road - East Shore
5	A 13 - A 25	Bay North of Pine Point
6	A 26 - A 49	Pine Point
7	A 50 - A 60	Sand Bay & Bonnechere
8	A 61 - A 86	Sand Beach
9	A 87 - B 103	South West Shore Hwy 62

THE SEPTIC TANK SYSTEM

(1) HOW A SEPTIC TANK SYSTEM WORKS

The purpose of a septic tank system is to return to the soil the sewage and other liquid wastes from the household in such a manner that ground water does not become polluted and no sewage appears at the ground surface. The system consists essentially of two main parts:

(a) The septic tank, which by settling out solids, prepares the sewage for absorption by the soil.

(b) The leaching bed where the liquid is treated and dispersed into the soil.

The purpose of the septic tank is frequently misunderstood. Its main function is to remove from the waste, solids which would otherwise plug the leaching bed. Bacterial action breaks down much of the solid matter to liquids and gases, and in an efficiently operating tank, only a liquid is discharged to the leaching bed. This liquid is still highly charged with bacteria and nutrients. Sufficient capacity is provided in the tank for the retention of insoluble matter. The removal, when necessary, of sludge and scum from the tank should ensure its continued efficient operation. This work should be carried out by persons operating a septic tank maintenance service.

The second part of the system is the leaching bed. It consists of lines of perforated or open jointed pipe, or of clay tile laid with open joints, located in trenches so that the liquid waste from the tank can pass into the soil where further treatment occurs, helping to purify the effluent so as not to contaminate ground or surface water. The perforated pipe or open jointed pipe or tile is referred to as the "distribution pipe" and is distinct from the solid pipe used in the system to transport the sewage to the leaching bed or as headers or connecting lines within the bed. The bacterial action in the leaching bed is aerobic, meaning that the presence of oxygen is necessary in the soil as the liquid filters downward through it. This important point is one of the principal considerations in establishing the depth of the soil filter required above high water table, rock or impervious soils.

(2) GENERAL CONSIDERATIONS

It will be seen that the design of a septic tank system depends mainly on three factors:

(a) The strength, nature and quantity of sewage

(b) The ability of the soil to absorb and treat the liquid waste

(c) The space occupied by the system and the clearance required to provide protection to the ground and surface waters against contamination due to this method of disposal.

(3) COMPOSITION OF SEWAGE

The wastes to be disposed of by the septic tank system includes discharge from toilets, waste water from kitchens, and the waste from baths, washbasins, showers, sinks and washing machines. Where garbage grinders are used, the waste from these units should also be discharged to the septic tank, but the system must be sized accordingly. Surface water from roofs and yards and foundation drainage must be excluded from the septic tank and the leaching bed area.

(4) SOILS - ASSESSMENT OF SUITABILITY

The suitability of the soil for absorbing the liquid waste depends on such characteristis of the soil as its grain size and gradation, the presence of organic compounds, and its structure, density, moisture content, "plastic" properties and chemical composition. These characteristics must be assessed and a judgement made as to the percolative capacity of the soil for handling septic tank effluent. For this assessment, inspectors may use an assortment of techniques such as visual inspection and field and laboratory soil tests and analysis. In marginal cases more extensive testing will be required to confirm the suitability or unsuitability of the soil. The result of the inspection and testing is a selection of a percolation rate, "t" time, expressed in minutes. This is a measure of the time taken for the water level in a hole in the soil to lower 1 inch due to absorption of the water into the surrounding soil and it can be measured directly by a standard percolation test.

Many factors affect the consistency and therefore the accuracy of the results obtained by the percolation test, and a person conducting the test must understand its limitations and the need for care in its execution. Other soil tests taken in the field only, or combined with laboratory tests, are necessary as a basis for assessment. In most cases a trained inspector will be able to estimate the percolation rate by the visual examination of test pits and of the soil layers so exposed combined with hand tests to determine the consistency of the soils encountered.

(5) DESIGN OF LEACHING BEDS - NORMAL CONDITIONS

The ideal location for a leaching bed is in a well-drained, sandy loam soil, remote from any wells or surface water. For the leaching bed to work satisfactorily the maximum elevation of the ground water table, or of any rock formation or layer of impervious material shall be at least 3 feet below the elevation of the bottom of the absorption trenches.

Where water table is the limiting factor it is the highest water table that is of concern rather than the average or that found at the time of site investigation. Any flooding within the 3 foot zone will restrict the access of oxygen to the soil and inhibit proper treatment. If the design is based on a water table elevation other than the maximum then the higher the water rises in the 3 foot zone the greater the risk of pollution to the ground water.

The normal leaching bed uses the trench method of installing the weeping tile or perforated pipe. When the sewage leaves the septic tank it must be divided equally amongst the weeping tile or perforated pipe in the leaching bed. This is accomplished either by use of a distribution box or by use of a solid header pipeline with watertight connections to individual weeping tile or perforated pipe lines. For both types of distribution, it is essential that the distribution box of the header pipeline is level and that it is installed on a solid foundation. An interconnection of the ends will provide a relief connection between runs so that an excess of effluent distributed to any one run from the header or distribution box can be redistributed to the remaining runs before pressures build up that could lead to a breakout to the surface. Interconnection is only possible if tile or pipe runs are at the same elevations.

Gravity flow is permitted for leaching beds with up to 500 lineal feet of tile or perforated pipe. If required by topography a pump may be used to left the effluent to a point where gravity flow will resume.

The area of a leaching bed should be generally free of trees and bushes so that the bed is well aired and sunlight is able to reach the surface. Trees will only be permitted within the area of the bed if it is judged that no damage will occur from the roots considering the size and type of the tree and the arrangement of the tile or pipe runs.

Normal leaching beds are not generally subject to damage by frost, providing construction details outlined herein are followed and there is continuous occupancy. However, certain conditions can cause such damage. For example, if the snow cover over a leaching bed is packed down either by foot traffic or by such causes as driving over the bed area in snowmobiles, the insulating quality of the snow will be lost and frost can penetrate deeper. If this is combined with periodic occupancy in winter, such as only on weekends, damage can occur either in the form of heaving which upsets the levelling of distribution boxes or pipes or of cracking of clay drain tiles which are particularly susceptible to damage in this manner.

A good growth of grass should be encouraged and maintained over the entire leaching bed area. The roots of grass and plants absorb liquid in the soil and transpire it to the atmosphere through the leaves. Sunlight should be allowed to reach the bed to promote evaporation.

(6) LOCATING A SEPTIC TANK SYSTEM

A septic tank should not be closer than:

- 50 feet to any well, lake, river, stream, water course, pond, spring or reservoir
- 5 feet to any building or structure
- 10 feet to any property boundary

The distribution pipe in a leaching bed shall not be closer than:

- 100 feet to the nearest dug well. This includes bored wells with non-watertight casings
- 50 feet to a drilled well which has a solid water-tight casing to 25 feet below ground
- 25 feet to any building or structure where the bottom of the perforated or open jointed pipe or tile is equal in level with or above the level of the lowest floor
- 10 feet to any building or structure where the bottom of the perforated or open jointed pipe or tile is below the level of the lowest floor.
- 10 feet to any property boundary
- 50 feet to any lake, river, stream, watercourse, pond, spring or reservoir.

The above distances are minimum according to the Regulations. A typical layout of a septic tank system illustrating some of the clearances outlined above is shown in Figure No. 7.

(7) OPERATION AND MAINTENANCE OF A SEPTIC TANK SYSTEM

People often ask whether certain types of waste may be discharged safely to a septic tank system and whether a grease trap is necessary. For normal domestic systems, no grease trap will be necessary for the small amount of grease coming from the kitchen. Similarly, detergents, lye, or other household cleansers or disinfectants in the recommended quantities should not hinder the bacterial action in the septic tank. Care should be taken, however, to ensure that excessive quantities of these materials do not enter the system. Some researchers have concluded that waste discharges from household water softener units appear to have no adverse effect on the action of the septic tank but will cause a slight shortening of the life of a leaching bed installed in some clay type soils. When installing a water softener extreme care should be taken in connecting these units to the disposal system to preclude any danger of cross connection between the water supply and the waste plumbing system.

Various preparations are on the market which are said to start, accelerate or improve the action in the septic tank. Apart from these proprietary products it is often suggested that yeast would help the action. There appears to be no necessity for the addition of any such product to the septic tank system. All bacteria necessary for the operation are already contained in the sewage entering the system.

With good design and careful construction, a septic tank system will need very little maintenance provided it is used properly. With suitable tank capacities, it should not be necessary to pump out the tank more than once every three years. It should, however, be inspected at least once a year and pumped out when necessary. Failure to pump out a septic tank when required will result in sludge or scum being carried into the leaching bed which in turn may clog and cease to function. In this event not only will the tank have to be pumped out but the leaching bed will have to be replaced.

Trouble is sometimes experienced with septic tank systems after large house parties have been held. During such periods abnormal quantities of liquid reach the system, which results in overloading. This may also occur because of flooding of the surface of the leaching bed area due to lawn watering, surface or roof drainage or because of faulty valve closures. These should be avoided.

Inspection of the sludge and scum accumulation is the only way to determine when a tank should be pumped out. This is indicated if either:

(a) the bottom of the scum mat is within approximately 3 inches of the bottom of the outlet fitting, or

(b) the surface of the sludge accumulation comes within 18 inches of the outlet fitting.

In most localities there are contractors who will pump out septic tanks. Tanks should not be washed or disinfected after pumping. The means and place of disposal of the contents of the tank must be approved by the appropriate authority.

A leaching bed can be damaged by vehicular traffic, blocking by excessive root growth, and freezing. As previously mentioned, snowmobiles driven over leaching beds destroy the natural insulation provided by the snow cover and allow frost to penetrate the bed especially where it is used intermittently (e.g. on weekends only) during the winter. Local pump out contractors or your local authority can advise on the need to pump out septic tanks which will not be used in the winter. Above ground tanks should normally be emptied but buried tanks are frequently left full. In cases where ground water in the spring may rise around a buried tank it can be "floated" out of the ground if it has been emptied.

TYPICAL ARRANGEMENT OF A SEPTIC TANK SYSTEM

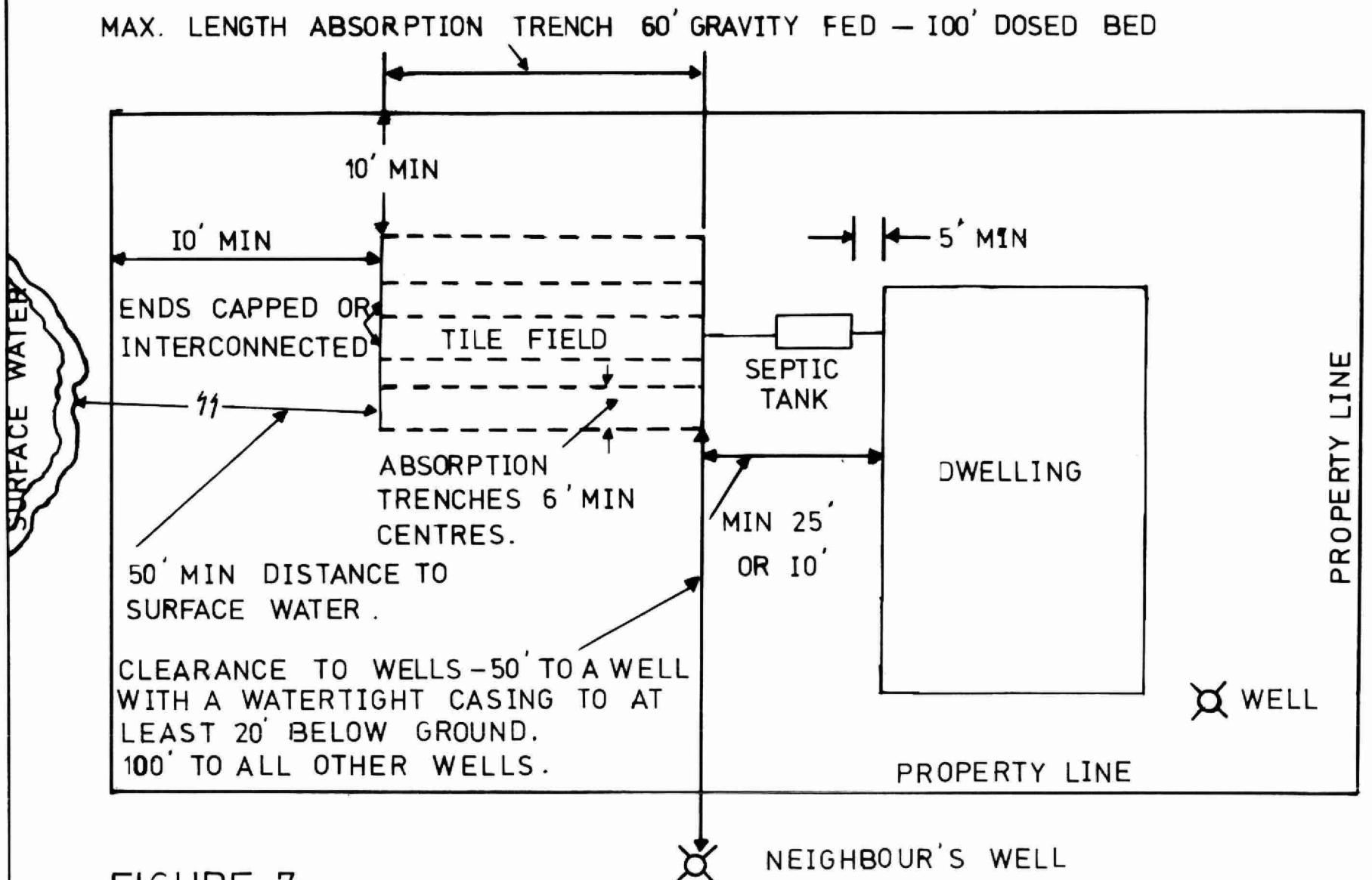


FIGURE 7

LEACHING PIT AND PIT PRIVY

An alternative to the septic tank system for sewage disposal is the combination of a pit privy and leaching pit. Figure 8.

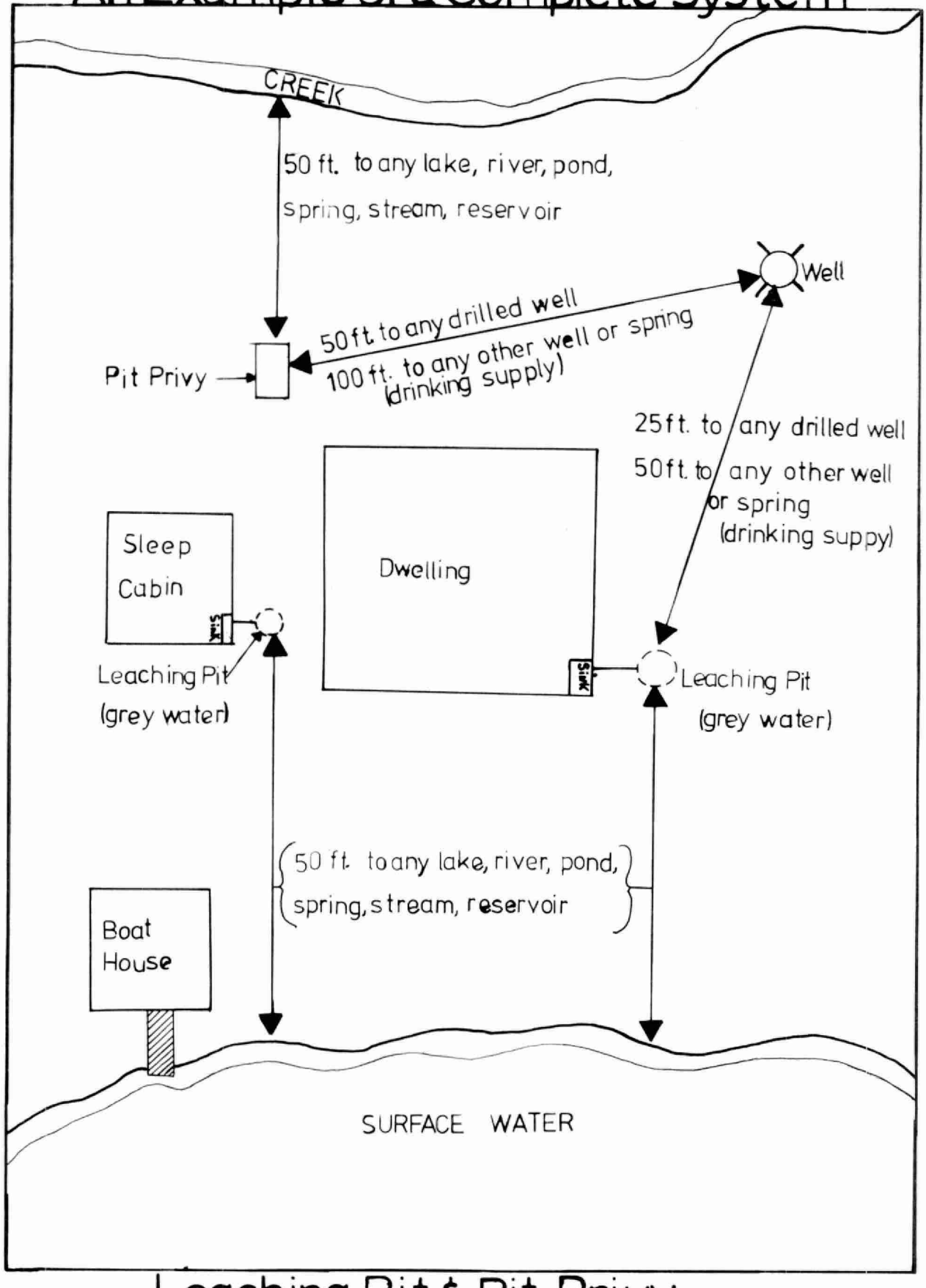
(1) LEACHING PIT:

A leaching pit is basically a hole in the ground in which washwater can be disposed of. Figure 9 and 10 show a typical leaching pit and outlines basic requirements. Use of a leaching pit in conjunction with a pressure water system is not recommended.

(2) PIT PRIVY:

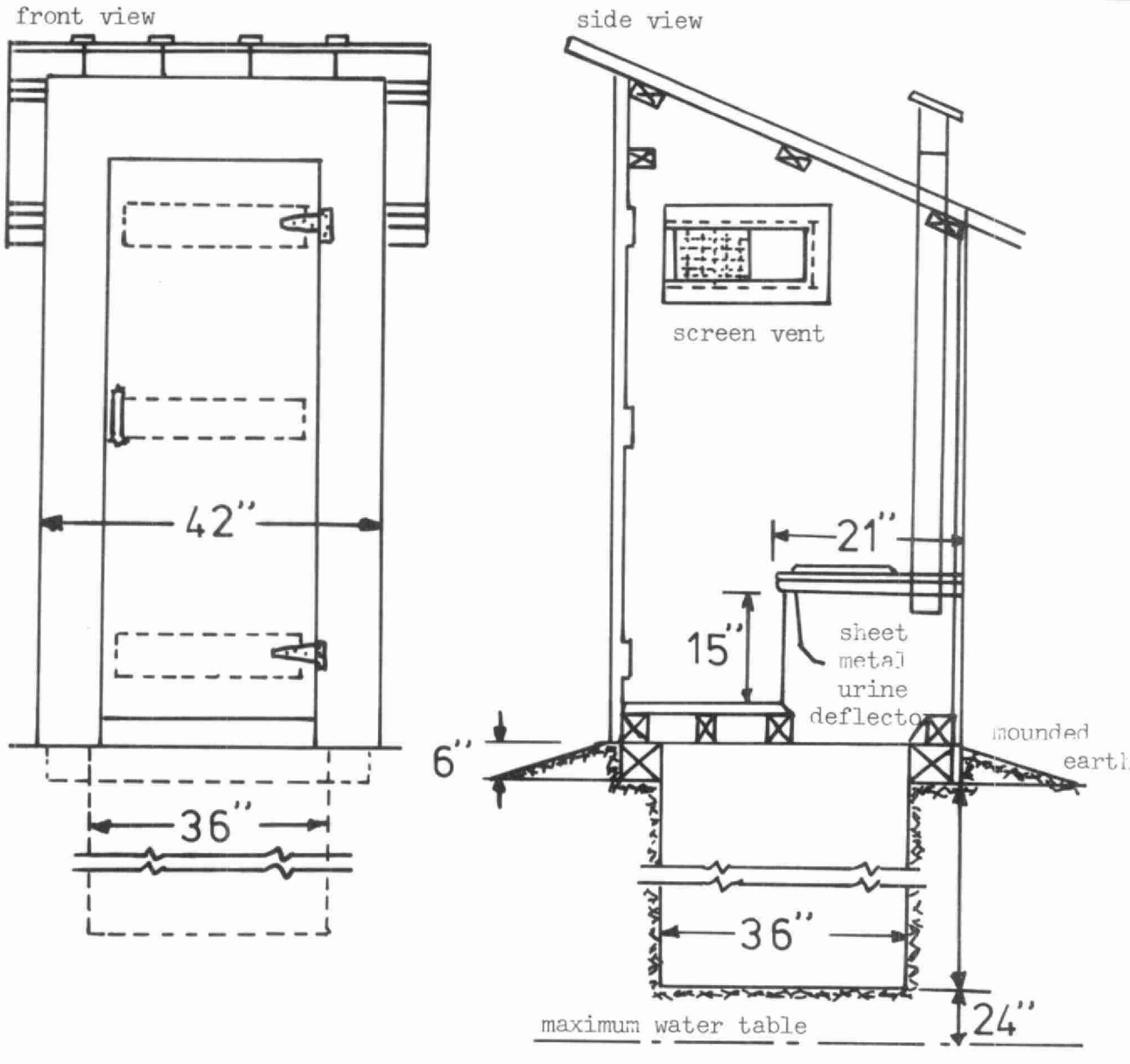
A pit privy is for the disposal of human body waste and is described in detail in Figure 11. Requirements for the location of a pit privy are also indicated in Figure 11.

FIGURE 8
An Example of a Complete System



Leaching Pit & Pit Privy

GUIDE TO CONSTRUCTION OF SANITARY PIT PRIVY FIGURE 11

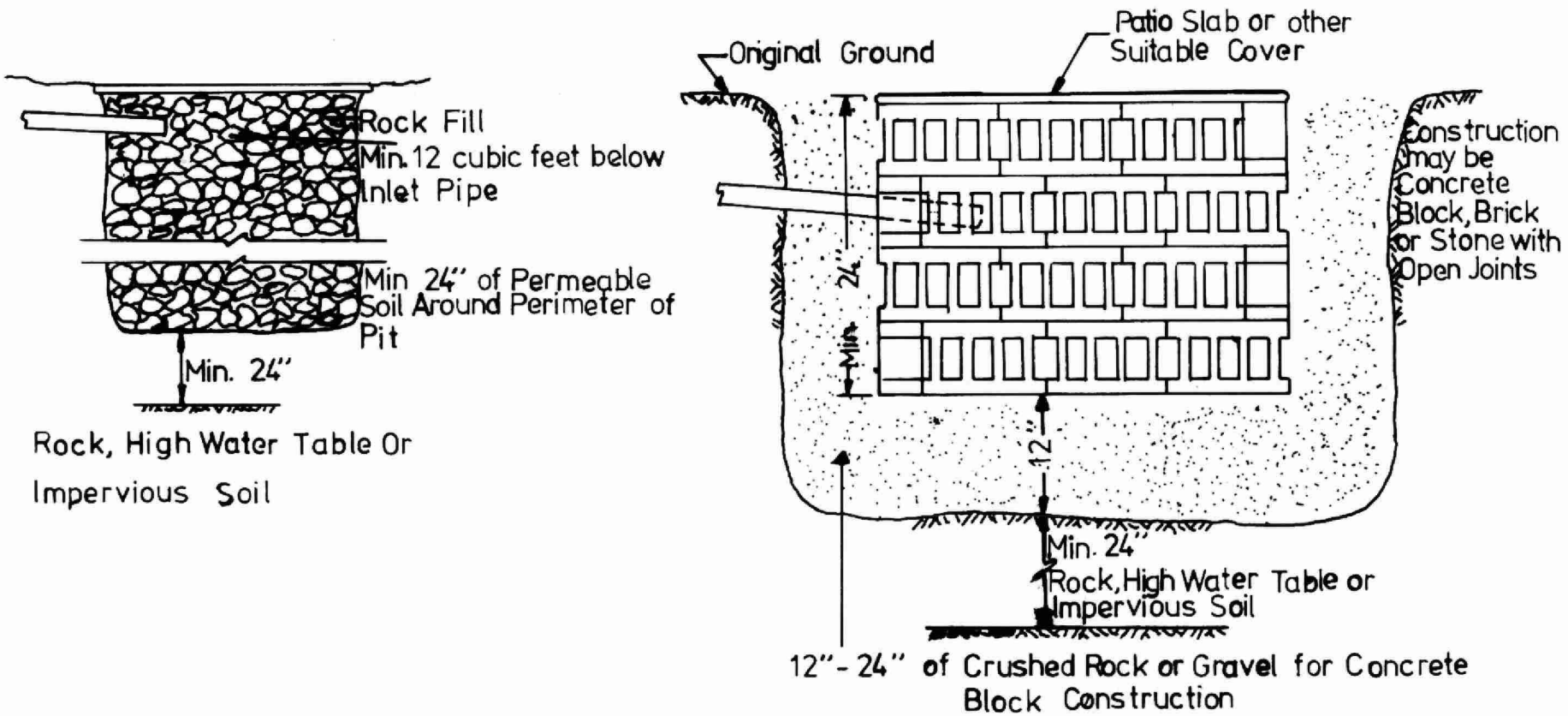


Notes

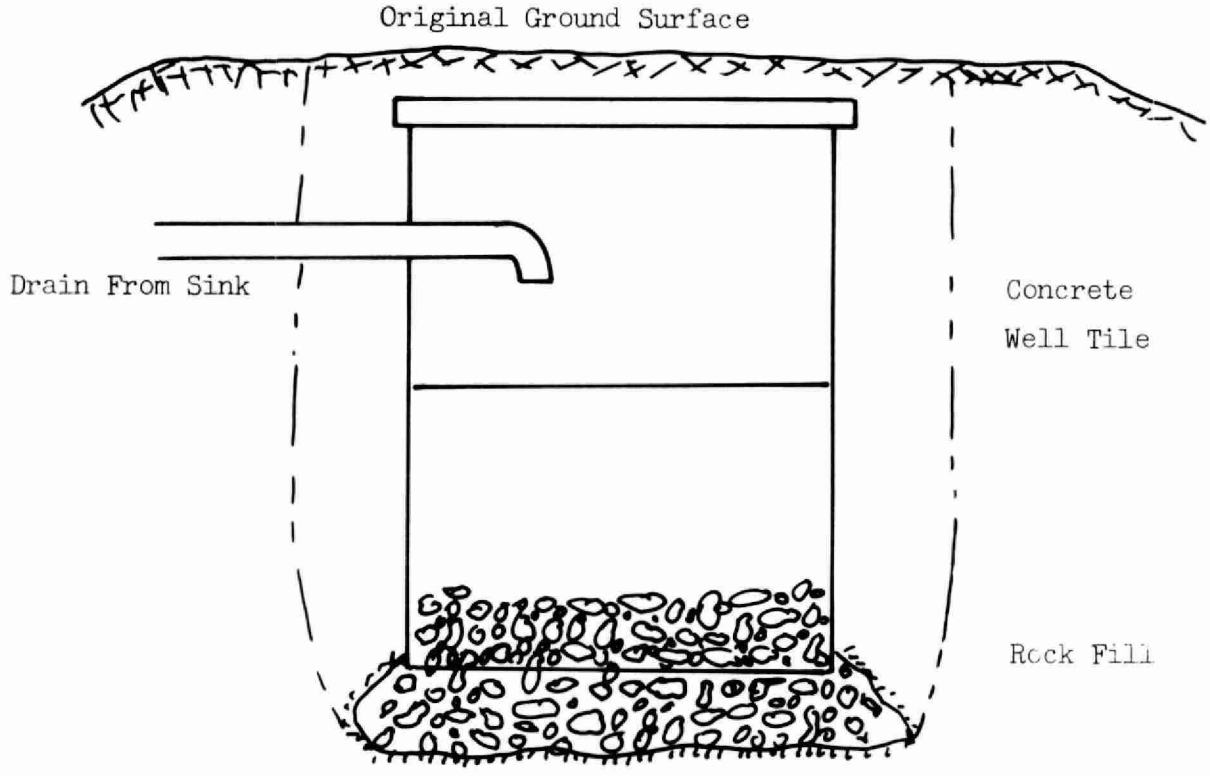
1. Approximate dimensions 3'-6" wide by 4' deep by 8' high, pit 3' by 3' with variable depth.
2. Bottom of pit not to be less than 2' above high water table or impervious stratum.
3. Privy should be vented and screened opening provided on sides near roof.
4. Privy should be waterproof, fly proof and may be of wood, brick, stone or any other suitable material.
5. Bottom 3 feet of structure to be covered by asphalt shingles or other suitable material to prevent animals gnawing at the wood.
6. Pit should provide an effective volume of 2 cu. ft/person/year for year round use.
7. Pit privy should not be constructed closer than 10' of lot line or 50' of kitchen, watercourse or well.

FIGURE 10

TYPICAL LEACHING PIT SYSTEM



TYPICAL LEACHING PIT Figure 9.



NOTES:

1. The leaching pit will accept only small amounts of grease without plugging the soil. Greases and oils from cooking should be disposed of with garbage.

2. The pit should be a minimum of 2 feet deep and have a working capacity of at least 6 cubic feet below the inlet pipe.

3. The surface of the ground around the pit shall be graded so that surface water will be diverted away from the pit.

4. The pit shall be surrounded on all sides and the bottom by at least two feet of earth which is protected from erosion by a pervious cover such as that provided by seeding or sodding.

5. In rocky ground a soil mantle should extend at least 10 feet in all directions from the leaching pit and at least 20 feet down hill.

6. The pit shall be at least 25 feet from a drilled well with casing to a depth of 25 feet and at least 50 feet from any dug well, spring, lake, river, pond, stream or reservoir.

RESULTS

ESTABLISHMENT TYPES

Of the 385 establishments surveyed on Round Lake, 39 were permanent homes, and 14 were commercial establishments. In addition, there were four farms. Of the 328 seasonal residences, 28 were trailers.
(Fig. 1, map enclosure and Fig. 12)

Figure 12

NUMBER AND TYPE OF ESTABLISHMENTS

Zone	Cottages	Houses	Trailers	Farms	Commercial	Total
1	47	0	2	0	8	57
2	34	8	2	2	0	46
3	46	6	1	0	0	53
4	13	2	3	0	1	19
5	8	1	3	0	0	12
6	22	1	5	0	0	28
7	4	1	5	2	0	12
8	24	1	1	0	0	26
9	102	19	6	0	5	132
Total	300	39	28	4	14	385

CLASSIFICATION

Of the total number of establishments surveyed, 67% were classified as having satisfactory sewage systems; 9% were classified as seriously substandard; 21% had inadequate or no means of disposing of grey water; and 3% were not classified. (Fig. 13 and 14)

No "direct polluters" were found, and no establishments were considered to have "nuisance toilets".

Figure 13

CLASSIFICATION OF ESTABLISHMENTS

Zone	1 Satisfactory		2 Seriously Substandard		3 Nuisance Washwater		4 Nuisance Toilet		5 Direct Polluter		6 Unclassified	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	42	71	3	5	12	20	-	-	-	-	2	3
2	33	72	5	11	6	13	-	-	-	-	2	4
3	45	85	5	9	3	6	-	-	-	-	-	-
4	12	67	4	22	2	11	-	-	-	-	-	-
5	8	67	1	8	3	25	-	-	-	-	-	-
6	16	57	-	-	11	39	-	-	-	-	1	4
7	5	38	2	15	4	31	-	-	-	-	2	15
8	20	77	1	19	5	4	-	-	-	-	-	-
9	96	71	8	6	28	21	-	-	-	-	4	3
Total	277	67	29	9	74	21	-	-	-	-	11	3

SEPTIC TANK SYSTEMS

Sixty-three percent of private establishments on Round Lake had septic tank systems; and of these, 50% were known to be approved by the Health Unit. (Fig. 15 and 16). Most tile field distances occured between 50' and 100' from the nearest surface water; although eight tile fields were found to be less than 50' from surface water. (Fig. 17, 18, 19 & 31)

Figure 16

ESTABLISHMENTS WITH SEPTIC TANK SYSTEMS

(Excluding Commercial)

Zone	Number of Establishments	Number of Septic Tank Systems	Percentage of Septic Tank Systems	Percentage of Septic Tank Systems Approved
1	47	40	82	25
2	46	33	71	60
3	53	35	66	23
4	19	12	63	50
5	12	7	58	57
6	28	13	46	92
7	12	3	25	67
8	26	18	69	44
9	132	73	57	64
Total	372	234	63	50

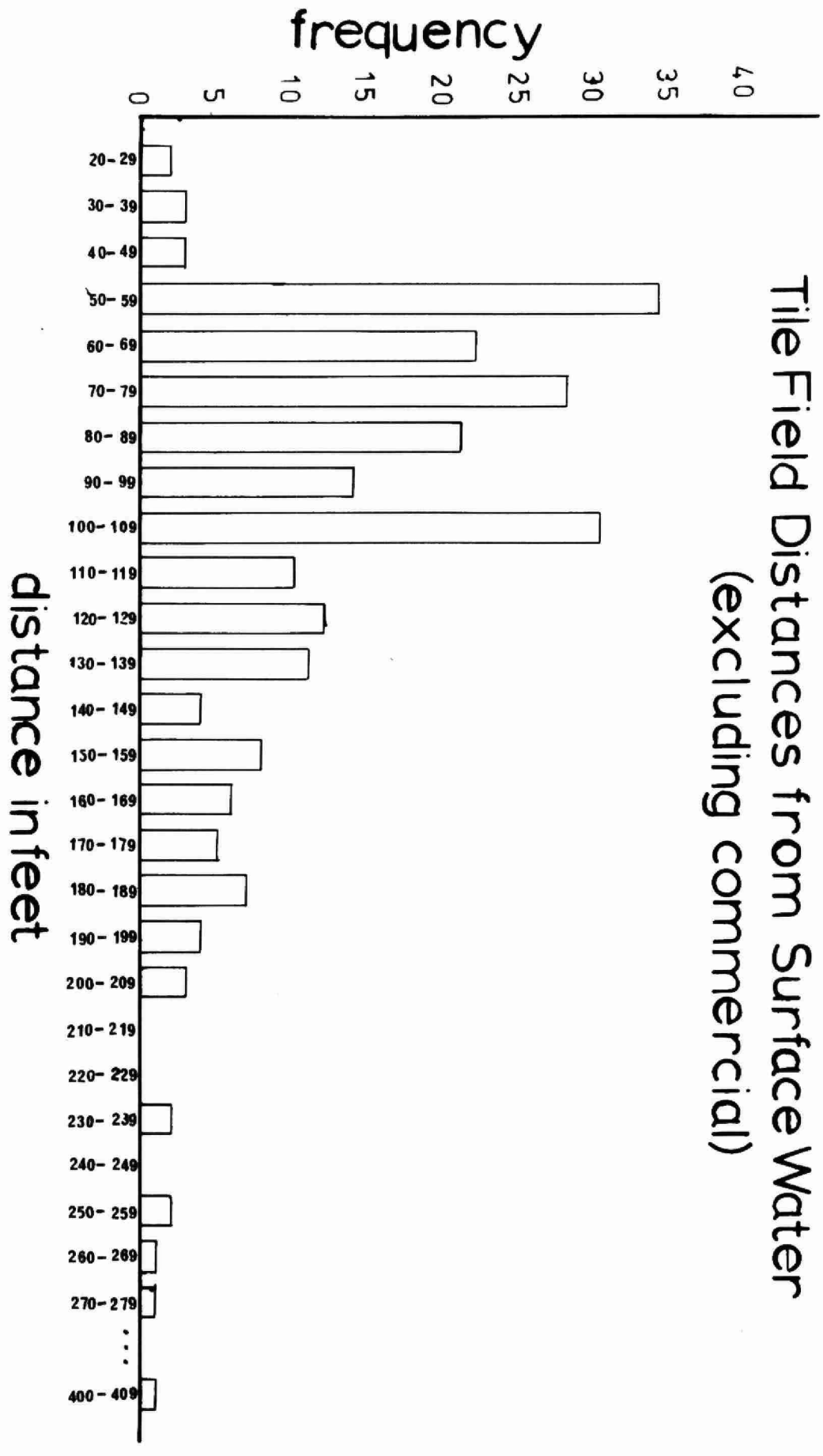


FIGURE 18

Tile Field Distances from Surface Water
(excluding commercial)

Figure 19

Tile Field Distances From Surface Water
(excluding commercial)

Tile Field Distance In Feet	Frequency
20 - 29	2
30 - 39	3
40 - 49	3
50 - 59	34
60 - 69	22
70 - 79	28
80 - 89	21
90 - 99	14
100 - 109	30
110 - 119	10
120 - 129	12
130 - 139	11
140 - 149	4
150 - 159	8
160 - 169	6
170 - 179	5
180 - 189	7
190 - 199	4
200 - 209	3
210 - 219	0
220 - 229	0
230 - 239	2
240 - 249	0
250 - 259	2
260 - 269	1
270 - 279	1
400	1
Total No of Septic Tank Systems -	234

LEACHING PITS

A total of 122 leaching pits were found on private establishments, 33% of the total (Fig. 20). of these, 17% were less than the required distance of 50' from surface water. (Fig. 21)

13% of all private establishments had a leaching pit/pit privy system as an alternative to the septic tank system. (Fig. 23)

Figure 20

TOTAL NUMBER OF LEACHING PITS

AND

AVERAGE DISTANCES

FROM

SURFACE WATER

(Excluding Commercial)

Zone	Number of Leaching Pits	Average Distance From Surface Water
1	15	80'
2	13	58'
3	36	101'
4	10	72'
5	3	73'
6	2	83'
7	0	
8	5	143'
9	38	94'
Total	122	88'

FIGURE 21

Leaching Pit Distances from Surface Water

(excluding commercial)

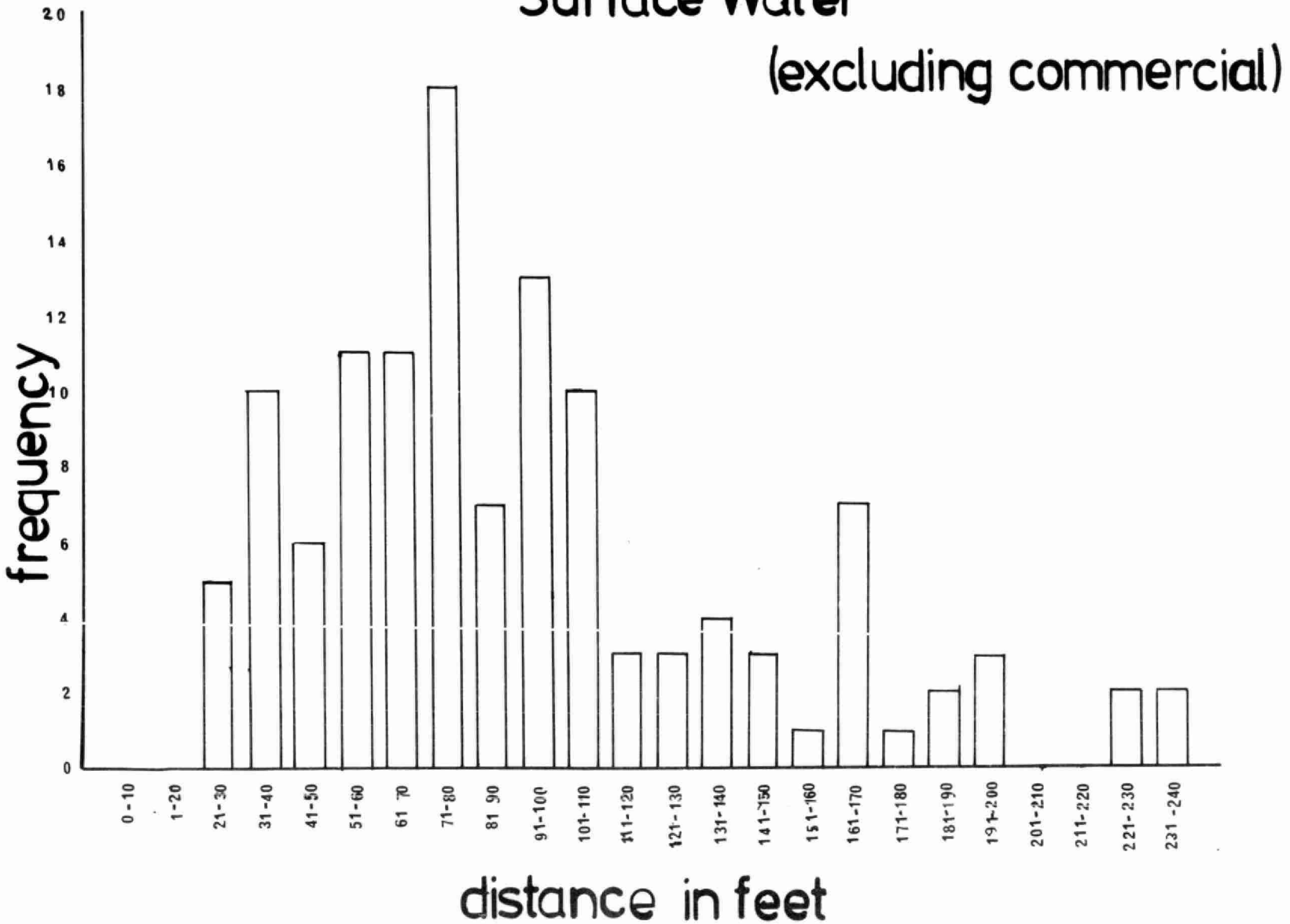


Figure 23

SEWAGE SYSTEMS WITH LEACHING PITS & PIT PRIVIES ONLY

(excluding commercial)

Zone	Number of Leaching Pits & Pit Privy	Total Establishments	Percentage of Leaching Pits & Pit Privies*
1	2	49	4
2	4	46	9
3	15	53	28
4	3	18	17
5	2	12	16
6	2	28	7
7	-	12	-
8	-	26	-
9	21	127	17
Total	49	371	13

* Percentage of establishments with leaching pits & pit privies and no septic tank

Figure 24

TOTAL NUMBER OF PIT PRIVIES AND THEIR AVERAGE DISTANCE * FROM SURFACE WATER

(excluding commercial)

Zones	Total Number of Pit Privies	Average Distance From Surface Water	Percentage of Non Vermin Proof
1	25	136	48
2	18	97	39
3	27	170	27
4	10	105	40
5	8	99	13
6	28	119	18
7	10	73	20
8	10	171	40
9	79	128	32
Total	215	122	31

* Distances and percentages rounded to nearest whole number

FIGURE 25

Pit Privy Distances from Surface Water (Excluding Commercial)

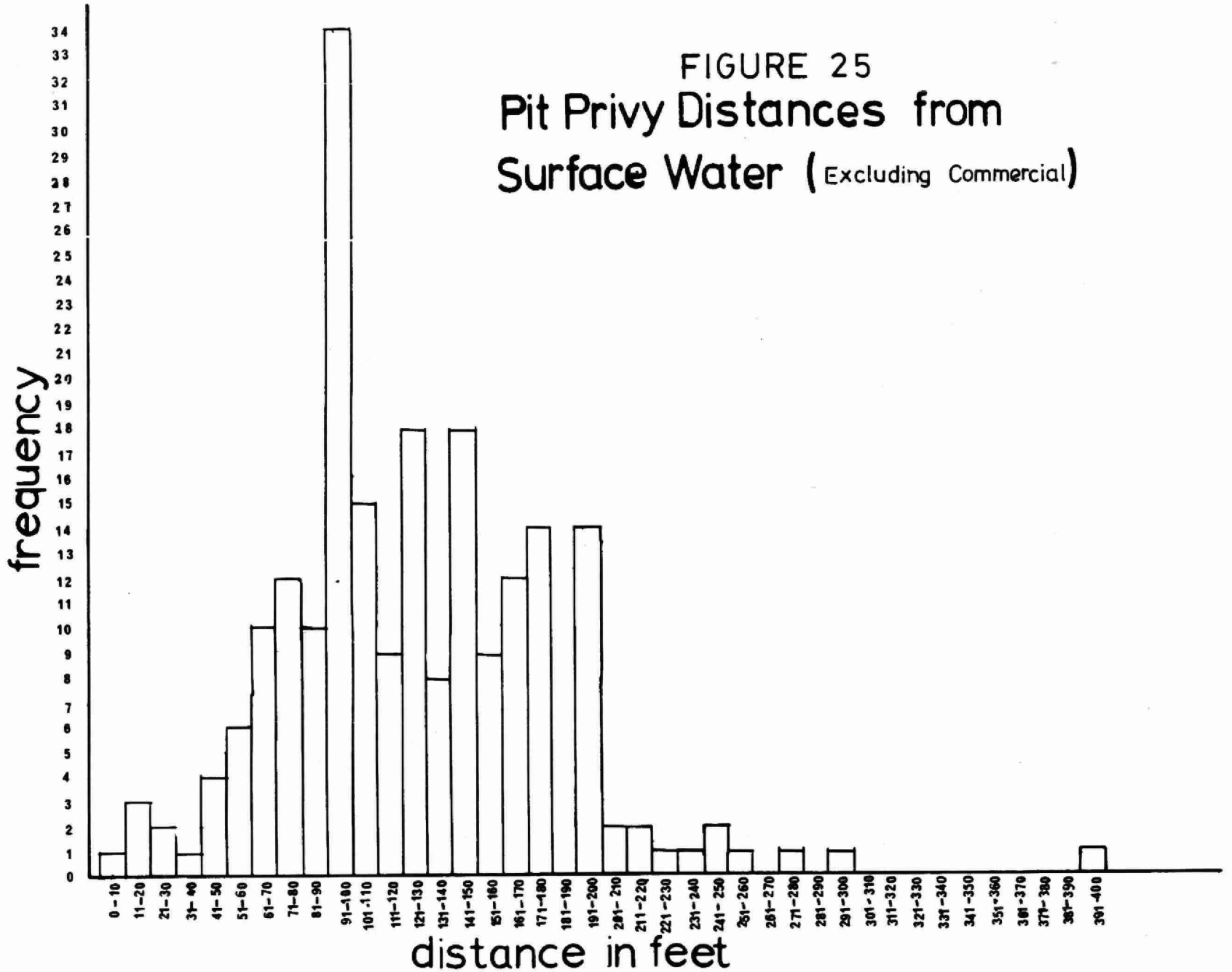


Figure 26

PIT PRIVY DISTANCES FROM SURFACE WATER

(Excluding Commercial)

Pit Privy Distances in Feet	Frequency	Pit Privy Distances in Feet	Frequency
0- 10	1	201-210	2
11- 20	3	211-220	2
21- 30	2	221-230	1
31- 40	1	231-240	1
41- 50	4	241-250	2
51- 60	6	251-260	1
61- 70	10	261-270	-
71- 80	12	271-280	1
81- 90	10	281-290	-
91-100	34	291-300	1
101-110	15	301-310	-
111-120	9	311-320	-
121-130	18	321-330	-
131-140	8	331-340	-
141-150	18	341-350	-
151-160	9	351-360	-
161-170	12	361-370	-
171-180	14	371-380	-
181-190	-	381-390	-
191-200	14	391-400	1

PIT PRIVIES

There were a total of 215 pit privies on Round Lake (Fig.24), of which 31% were not vermin proof. (Fig.25) Only 3% were found to be less than the required 50' from surface water. (Fig. 26 and 32).

COMMERCIAL ESTABLISHMENTS

Of the 14 commercial properties on Round Lake, two were bible camps and seven were resorts, including one Provincial Park. There was also one each of the following:

Ministry of Natural Resources Work Centre,

Ministry of Natrual Resources employee cabins,

Public Beach,

Church,

Junior Ranger Camp.

When operating at capacity the commercial establishments can support 253 tents and trailers, and a total of 34 cabins or cottages. Together, these constitute 44% of the total number of cottages, tents and trailers on Round Lake. The seven resorts alone have a total of 25 cottages and 233 tent and trailer sites.

CLASSIFICATION

Of the seven resorts, two were considered satisfactory, and two were seriously substandard. Two had a "nuisance washwater" classification, and two resorts, including the one remaining unclassified, required a further inspection by Ministry of the Environment officials.

Of the remaining seven commercial properties all were considered satisfactory, except for one seriously sub-standard.

ESTABLISHMENT DISTANCES FROM ROUND LAKE

The average distance of cottages from the lake was 72', (Fig.27) but this varied considerably from zone to zone. Zone 2 had an average cottage distance of only 46'. Similarly, those cottages on the Red Rock Road in Zone 4 were only an average of 51' from the lake. St. Patricks Bay, (Zone 3) and the long sandy beach in Zone 8 were an average of 100'and 131' away, respectively.

WATER SUPPLY

Of the total number of establishments on Round Lake, 19% drew some form of water supply directly from the lake. In addition, 49% had dug wells; 14%, sand or drive points; and 11%, drilled wells. Two percent obtained their water from a spring source and 8% shared their wells with neighbours. (Fig.28 and 29).

Sixty-five percent of all sand point wells occured on the western shore in zones 1 and 9.

Figure 27

AVERAGE DISTANCES OF ESTABLISHMENTS FROM ROUND LAKE

(Excluding Commercial)

Zone	Number of Establishments	Average Distance in Feet
1	49	55
2	46	46
3	53	100
4	18	51
5	12	57
6	28	63
7	12	72
8	26	131
9	127	72
Total	371	72

WATER SUPPLY Figure 29.

Zone	Dug Well	Drilled Well	Sand Point	Spring	Lake	Shared Well
1	20	8	24	2	9	6
2	16	6	5	2	10	5
3	38	4	6	0	6	3
4	15	0	0	0	5	0
5	1	3	3	0	3	1
6	8	3	1	0	14	1
7	3	1	2	0	4	3
8	17	0	2	0	4	3
9	71	18	12	2	18	10
Total	189	43	55	6	73	32
%	49	11	14	2	19	8

OBSERVATIONS AND DISCUSSION

SEPTIC TANK SYSTEMS

Several cottagers were reluctant to dispose of large quantities of washwater into their septic tank systems, being under the false impression that this practice is detrimental to the normal functioning of the system. Much confusion exists on this point, and cottagers are urged to consult their local Health Unit. It is recommended that sewage and grey water wastes should all empty into the septic tank system, provided that it is of a suitable size. See appendix: "Care and Maintenance of a Septic Tank System".

NUISANCE WASHWATER

Many of the establishments considered to have "nuisance washwater" (i.e., they discharge their grey water onto the surface) could remedy the situation by the installation of a leaching pit.

WELLS

A number of wells were found to be closer to the sewage systems than the recommended distances. Cottagers are urged to test their water by sending a sample to the Health Unit at the beginning of the season, and again later in the summer.

RESORTS

Although there are only seven resorts on Round Lake, the large number of cabins, tents and trailers (258), constitutes 39% of the total number of dwellings on the lake.

The resorts were observed to be operating at full capacity on long weekends, putting considerable strain on the facilities available.

FOY'S POINT

Cottagers were concerned about the possibility of another Provincial Park on this underdeveloped peninsula. All expressed a desire that there should be no further commercial development on Round Lake.

WASHING AND SHAMPOOING IN THE LAKE

Many people were observed washing and shampooing in the Lake. Most were unaware of the harmful long term effects of soap and detergents.

WINTER USES

A number of homes are being winterised for winter recreational use on the lake, and for future retirement homes. In such cases, extra care should be taken in the installation of septic tank systems, to ensure efficient operation throughout the year.

Concern has been expressed about farm cattle drinking from the lake in winter, and the ensuring solid wastes left on the shore in spring.

Similar worries have been voiced about the quantity of garbage left by ice fishermen. Ministry of the Environment personnel will be monitoring this problem closely this coming winter. (1978-79)

CONCLUSION

Although 72% of establishments were classified as satisfactory, this percentage may further be improved with the cooperation of cottage owners. With proper planning, adequate sewage systems can be installed with advice readily available from the Health Unit.

The sandy soils around the lake provide an excellent medium for filtration, and have contributed to the present quality of the lake water, in spite of the large population present.

It is hoped that organizations like the Cottage Owners Association of Round Lake can work with the Renfrew County Health Unit and the Ministry of the Environment to preserve and improve the quality of Round Lake for future generations to enjoy.

ACKNOWLEDGEMENTS

The students from Algonquin College, Pembroke, who worked on the project, would like to thank those members of the Round Lake Cottage Owners Association whose help in providing accomodation and support made the survey possible.

NOTES OF GENERAL INFORMATION TO COTTAGERS

Preserving Water Quality

Clean water is necessary for drinking, recreation and the survival of aquatic life.

Here are some ways to control its quality.

1) Keep your family and yourself informed about the causes of pollution and its danger.
2) Join and support citizen groups in working for better water quality.
3) Check your personal water habits when fishing, boating and picnicking. Keep river banks and shorelines clean.
4) Don't leave water taps running unnecessarily. The water you are using doesn't belong solely to you.
5) Measure detergents carefully. This significantly reduces the problem of phosphate pollution.
6) Use soap flakes or phosphate free detergents whenever possible.
7) Check the solids level in your septic tank at least every second year.
8) Fill outboard motors carefully. Don't drain oil or gas from power mowers or other machines into sewer systems or water courses.
9) Never flush away what can be put into the garbage. Some objects cannot be broken down in water and cause serious pollution problems.
10) Report violations of pollution abatement regulations to your local health department, the police, or the Ministry of the Environment.

APPENDIX A

THE NUMBER OF SEPTIC TANK SYSTEMS BY ZONE AND THEIR DISTANCES FROM SURFACE WATER

(Excluding Commercial)

Zone 1		Zone 2		Zone 3	
Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems
50	5	35	1	50	5
60	4	40	1	54	2
65	1	50	10	67	2
66	4	54	1	70	4
70	2	60	2	75	1
72	1	63	1	80	2
75	3	65	1	90	1
80	3	66	4	95	1
90	1	70	3	100	6
95	1	72	1	120	2
96	1	75	1	130	1
100	4	80	2	145	3
110	4	90	1	180	2
120	2	120	1	200	1
140	1	150	2	230	1
150	3	160	1	250	1
Total	40	Total	33	Total	35

APPENDIX A

Zone 4		Zone 5		Zone 6	
Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems
40	1	36	1	55	1
55	2	60	1	70	1
65	1	75	1	90	1
70	1	100	1	100	1
75	1	105	1	105	1
80	2	110	1	115	1
85	2	120	1	120	1
110	1	Total	7	130	1
120	1			135	2
Total	12			150	1
				170	2
				Total	13

Zone 7

Distance in feet	Number of Septic Tank Systems
80	1
130	2
Total	3

APPENDIX A

Zone 8		Zone 9		Zone 9 Continued	
Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems	Distance in feet	Number of Septic Tank Systems
65	1	25	2	165	2
100	1	30	1	170	2
105	1	45	1	185	1
116	1	50	8	190	2
132	1	60	3	195	1
140	2	65	2	200	1
160	1	70	3	205	1
175	1	75	5	265	1
180	1	80	3	Total	73
185	2	85	4		
186	1	88	2		
190	1	92	1		
230	1	95	2		
255	1	100	11		
270	1	105	2		
400	1	106	1		
Total	18	110	1		
		111	1		
		120	3		
		125	1		
		130	1		
		132	2		
		134	1		
		160	1		

APPENDIX B

THE NUMBER OF PIT PRIVIES BY ZONE AND THEIR DISTANCES FROM SURFACE WATER

(Excluding Commercial)

Zone 1		Zone 2		Zone 3		Zone 4	
Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies
70	1	60	2	20	1	41	1
80	1	65	1	75	1	75	1
100	2	66	1	105	2	80	1
110	3	70	1	110	1	90	1
120	2	75	1	130	2	100	2
130	3	90	2	140	1	110	1
140	2	100	4	150	2	126	1
150	7	110	1	155	1	145	1
166	1	120	2	160	1	180	1
170	1	150	1	176	2	Total	10
200	1	180	1	180	1		
230	1	Total	17	200	4		
Total	25			210	1		
				220	2		
				240	1		
				250	2		
				260	1		
				280	1		
				Total	27		

APPENDIX B

Zone 5		Zone 6		Zone 7		Zone 8	
Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies	Distance in feet	Number of Pit Privies
65	1	50	2	17	1	80	1
80	2	65	1	50	1	100	1
84	1	80	2	55	1	125	1
100	2	95	1	65	1	140	1
130	1	96	1	66	1	180	1
155	1	100	6	70	1	205	1
Total	8	109	1	90	1	300	1
		110	1	96	1	400	1
		125	1	105	1	Total	8
		130	2	120	1		
		132	1	Total	10		
		145	1				
		150	1				
		155	1				
		160	1				
		170	3				
		180	2				
		Total	28				

APPENDIX B

Zone 9

Distance in feet	Number of Pit Privies
5	1
15	1
30	2
35	1
55	2
60	1
66	1
75	1
80	1
90	5
100	12
110	4
120	4
125	3
130	4
140	3
145	2
150	4
155	1
160	2
165	4
170	4
175	4
180	2
200	9
Total	78

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